

REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections. Favorable reconsideration of the application in light of the following arguments is respectfully requested.

Claims 1-10 are pending in the application. In the response claims 1-9 have been amended and claim 10 has been canceled. It is respectfully submitted that no new matter was added in making these changes.

OBJECTIONS TO THE CLAIMS

Claim 4-10 were objected to for being in improper multiple dependent form. Specifically, the Examiner noted that several of these claims referred back to "at least one" of the previous dependent claims. In response thereto, claims 4-10 have been amended herein to be placed in proper multiply dependent form. It is additionally noted that several of these claims referred back to another multiply dependent claim which is not permitted. Therefore, these claims were further amended so that multiple dependent claims did not depend from previous multiple dependent claims.

REJECTIONS UNDER 35 USC §112

In the Office Action, the Examiner rejects claims 1-3 under USC §112 for indefiniteness. In response thereto, claims 1-3 have been rewritten herein in a manner believed to be more definite. Specifically, it has been specified that the three dimensional preform has a three-dimensional target form, as shown on page 1, lines 3-6 and page 6, lines 13-15 of the application as filed. For clarity, the term two dimensional

bonded fiber has been replaced by two dimensional bonded fabric (as shown on page 4, lines 19-20 for example.) A new step a) has been introduced to claim 1, which is found in the application as filed at least page 5, lines 2-5. What is now step b) of claim 1, is shown, at least, on page 4, lines 16-20 of the specification. In view of the above, reconsideration and withdrawal of this rejection are respectfully requested.

REJECTIONS UNDER 35 USC 102

Claims 1-3 were rejected under 35 USC 102 as being anticipated by Evans. The Examiner stated that Evans taught a method for the production of a three-dimensional preform from textile starting material comprising pre-impregnating tape of unidirectional fibers bonded together by the impregnating resin,. A CAD system calculates ply orientation and geometry from a three dimensional target form. The textile starting material is then laid down two-dimensionally in a plane and cut to the required geometry. The Examiner states that Evans clearly teaches the claimed shaping step.

Claim 1 defines a method for the production of a three-dimensional preform having a final three dimensional target shape from textile starting materials such as fibers, fiber bundles or tapes. The fiber geometry and orientation in a two-dimensional bonded fabric is determined by back-calculation from the final three-dimensional target shape. The textile starting materials are laid two-dimensionally in a plane to manufacture a two-dimensional bonded fabric, whereby the textile starting materials are laid such that the orientation of the fibers of the textile starting material and the geometry of the two-dimensional bonded ~~fiber has been~~ fabric are as back-calculated

from the three-dimensional target shape. The final three-dimensional target shape is produced by shaping/draping of the two-dimensional bonded fabric.

Thus, the present invention, as defined in independent claim 1, defines a method for producing a three dimensional preform, wherein complex three-dimensional geometries, an optimal fiber orientation and a high deposit rate can be achieved. It is significant to note that in claim 1, the geometry of the two-dimensional bonded fabric is determined by back-calculation from a target three-dimensional target shape. The second step of claim 1 indicates that the two-dimensional bonded fabric is shaped or draped to produce the three-dimensional preform. Thus the present claimed invention allows the formation of three-dimensional shapes.

The Evans reference discloses a process for the production of a composite laminate article, for example fan blades, by using laminates including unidirectional fibers. Thus the Evans reference comprises the use of single plies running parallel to one another. This differs from the claimed invention in significant ways. First, the unidirectional fibers of Evans would not lead to the final three dimensional piece formed through the process of the present invention. Nothing in a parallel two-dimensional structure would lead to the final three-dimensional structure defined by the present invention. The present invention works backwards from a planned three dimensional product which is not shown in the applied reference. Further, Evans arranges a plurality of parallel plies to build a three dimensional component. This is not what is claimed in the present invention, wherein the two-dimensional bonded fabric is shaped or draped to form the three-dimensional preform. I.e. the fibers are placed into an orientation which is necessary to achieve the final three dimensional preform.

In view of the above, it is respectfully submitted that claim 1 is not anticipated by the Evans reference. Claims 2-3, and claims 4-9, depend from claim 1 and are believed to be allowable based, at least, on this dependence.

REJECTIONS UNDER 35 USC 102/103

Claims 1-3 were also rejected as being anticipated by, or obvious over US 4,938,824 to Youngkeit. Youngkeit teaches a method for the production of a non-cylindrical composite component by winding a transverse type comprising a at least one fiber strand impregnated by resin. First a transverse tape is produced wherein the fibers are regularly placed under a predetermined angle with respect to one another. By winding this tape with any conventional tape winding apparatus a non-cylindrical component is produced. Thus the fibers are fixed in the tape under the angle determined during production of the tape.

Youngkeit adapts the width of the tape to the desired characteristics of the component to be made. The orientation of the fibers is fixed within each tape, and are fixed at 45 degree angles relative to each other. It should be noted, however, that this angle is not fixed based upon the desired characteristics of the final component. There is no teaching or suggestion in this applied reference to utilize it as in claim 1 of the present invention. The number of plies laid down in youngkeit depends on the characteristics of the component to be made, but changing the orientation of the fibers is not taught or suggested. There is no teaching or suggestion to lay out the two-dimensional bonded fabric, the orientation of the fibers of which is back-calculated from the final three dimensional target shape. One skilled in the art would not arrive at the

teachings of the present invention merely in view of the Youngkeit reference., specifically that the fibers in a two-dimensional bonded fabric are laid down in a two-dimensional plane in order to manufacture a three-dimensional preform which has the fiber orientation and geometry required by the application of the preform.

In view of the above, it is respectfully submitted that nothing in the Youngkeit reference teaches or suggests the present invention as claimed in claim 1. Claims 2-9 depend from what is believed to be an allowable claim 1 and are believed to be allowable based, at least, upon this dependence.

Summary

As noted above claim 1, and the claims dependent therefrom, are believed to be allowable over the applied art of record. In view of the above, it is submitted that the application is in condition for allowance, and action towards that end is respectfully requested. Should the Examiner wish to modify the application in any way, applicant's attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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